

Within chemical industry, human factors in its **infancy**

Human factors used in Responsible Care

Take human factors further

Look around

Look ahead

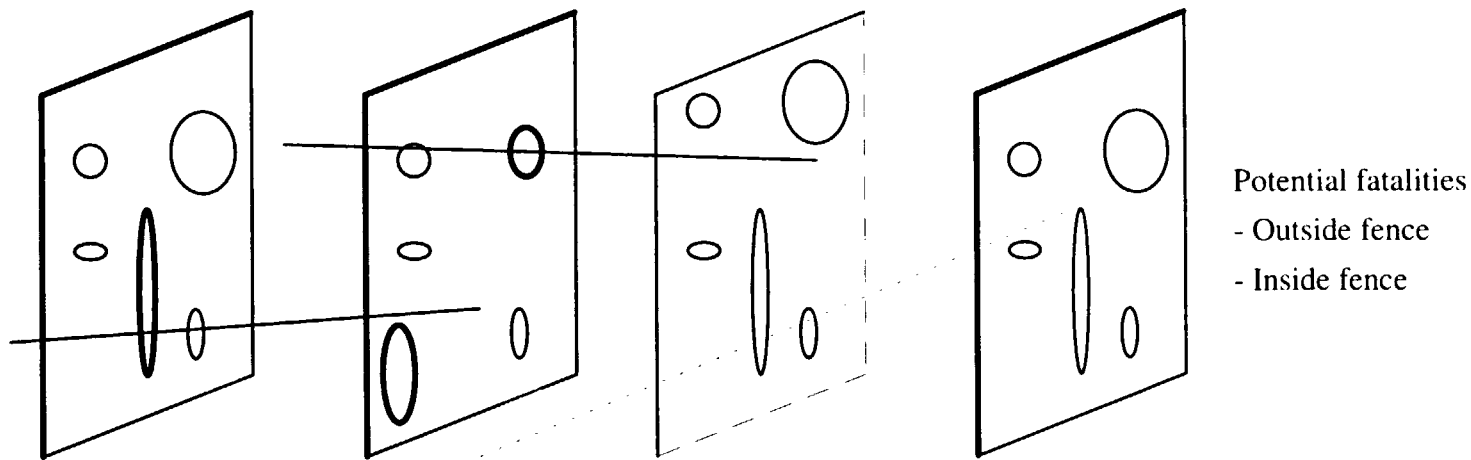
Human Factors used in Responsible Care Programs (tools)

Outside fence (human error analysis)

Internal program

Inside fence (HFA checklist, human error analysis)

Internal program converted to OSHA 1910.119



Fix the system

- Add protection layers
- Alter holes (number, size)

Correct action errors versus planning errors

Human Factors Analysis Checklist

Design features

- Directed towards **critical** tasks

- Identifies **non-specific** human errors

- Supplements** What-if Checklist

- Credits** existing programs:

 - Training

 - Experience level

 - Procedures manuals

 - Maintenance equipment

 - Operational Safety Standards

Findings

- Not all questions identify human errors each time

- Identifies action errors versus planning errors

To get beyond infancy, **Take human factors further**

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Take Human Factors Further

Look around to what you and others already do

OSHA PSM Program

Performance appraisal system (behavior)

Control rooms (interfaces, cognitive, staffing)

Data bases (options)

Aviation equipment (options)

Aviation cockpits (training)

Hospitals (teams)

Ship's bridge and in-land waterways towboats (training)

Ship maintenance (staffing)

Golf (training)

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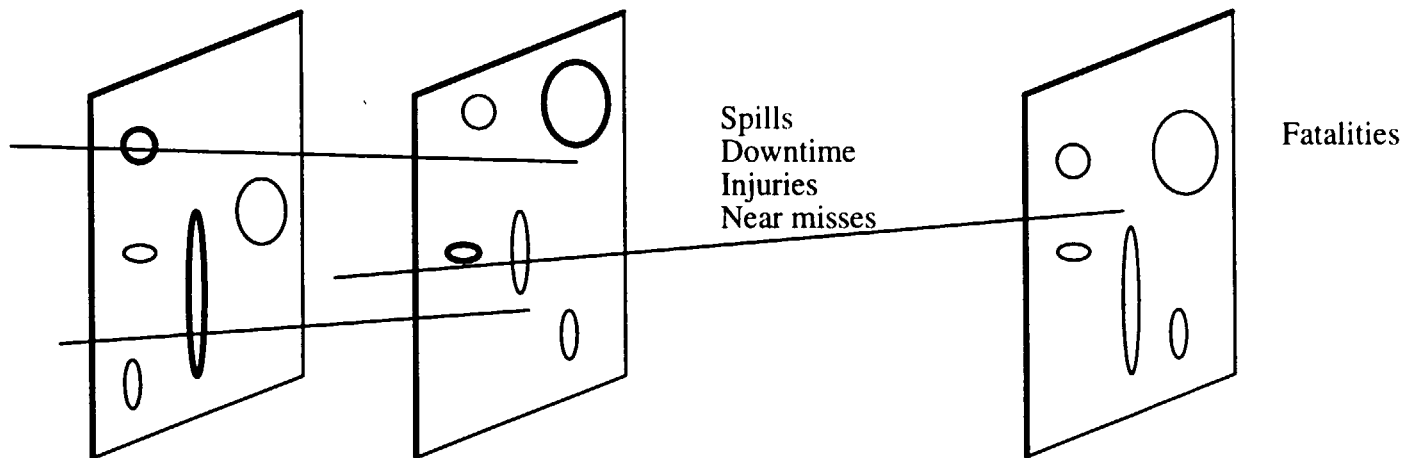
Look around

Look ahead

Take Human Factors Further

Look ahead to Responsible Care

Investigate incidents/accidents **quantitatively**



Findings: No exact repeats

Potential results:

- Find potential other paths

- Use Fault Tree Analysis to check Root Cause Analysis findings

- Could test equipment data and human error model

Take Human Factors Further

Look ahead beyond Responsible Care

Inspections

Manpower allocations

Organizational structures

Reliability

Training

Etc.

Findings

Learn more about human factors

- Low versus high severity hazards

- Personal experience versus others

Improve “action” error reduction priorities

Correcting “planning” errors harder than “action” errors

Recommendations

In Programs, do more simultaneously

Fatalities, spills, downtime, injuries, etc.

Learn from investigations, other disciplines, and other industries

Pick 1 or 2 things to apply human factors

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